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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/687,550	10/15/2003	Edward J. Seppi	VM7036492003	7696
55499 7590 08/21/2007 VARIAN MEDICAL SYSTEMS TECHNOLOGIES, INC. c/o BINGHAM MCCUTCHEN LLP THREE EMBARCADERO CENTER SAN FRANCISCO, CA 94111-4067			EXAMINER MALEVIC, DJURA	
			ART UNIT 2884	PAPER NUMBER
			MAIL DATE 08/21/2007	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

**Office Action Summary**

Application No.

10/687,550

Applicant(s)

SEPPI ET AL.

Examiner

Djura Malevic

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 29 May 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1,2,4-9 and 11-55 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,2,4-9 and 11-55 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10/15/2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☒ Interview Summary (PTO-413)  
Paper No(s)/Mail Date 20070815.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### Response to Amendment

The amendment filed 05/29/2007 was entered.

### Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 2, 7- 9,11,13-17 and 46 are rejected under 35 U.S.C. 102(b) as being anticipated by Mazess et al. (US Patent 5,841,833).

With regards to claim 1, Mazess discloses a detector assembly (Figure 21 –23), comprising: a plurality of first imaging elements made from a first scintillating material 308 that has a first radiation detection characteristic; and a plurality of second imaging elements made from a second scintillating material 312 that has a second radiation detection characteristic (i.e. high and low energies) (Col. 27, Lines 23 – 45).

With regards to claim 2, Mazess discloses either or both of the first imaging elements and the second imaging elements comprise a scintillating material for converting x-ray radiation into photons (Col. 27, Line 11) (Figure 21).

With regards to claim 6, Mazess discloses the first imaging elements and the second imaging elements are arranged relative to each other in a checkerboard pattern (Figure 21).

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With regards to claim 7, Mazess discloses the first imaging elements are arranged in a plurality of first lines, and the second imaging elements are arranged in a plurality of second lines (Col. 2, Lines 53-54).

With regards to claim 8, Mazess discloses each of the first lines is positioned adjacent to one of the second lines (Col. 2, Lines 53-54) (Figure 27).

With regards to claims 9 and 46, Mazess discloses a radiation projection detector for generating signals in response to a radiation beam (Figure 21), comprising: a conversion panel (Figure 21) configured to generate light photons (i.e. scintillation) in response to a radiation, the conversion panel having a plurality of first conversion elements 308 and a plurality of second conversion elements 312; and a photo detector array aligned with the conversion panel (Figure 22), the photo detector array comprises a plurality of detector elements, each of the detector elements configured to generate a signal in response to light photons received (i.e. photo diodes) from the conversion panel; wherein each of the first conversion elements has a first radiation to photon conversion characteristic, and each of the second conversion elements has a second radiation to photon conversion characteristic (Col. 27, Lines 23 – 45).

With regards to claim 11, Mazess discloses the first conversion elements are configured for generating light photons in response to radiation at a first energy level, and the second conversion elements are configured for generating light photons in response to radiation at a second energy level (Col 27, Lines 23 – 45).

With regards to claim 13, Mazess discloses a checkerboard pattern (Figure 21).

With regards to claim 14, Mazess discloses the plurality of the first and the second conversion elements are arranged in a plurality of lines, and each of the plurality of lines of the first conversion elements is located adjacent one of the plurality of lines of the second conversion elements (Figure 7, Col. 2, Lines 47-57).

With regards to claim 15, Mazess discloses the plurality of detector elements comprises a plurality of first detector elements and a plurality of second detector elements (Figures 27, 21 –23).

With regards to claim 16, Mazess discloses the plurality of the first detector elements are configured to generate signals in response to photons having a first energy level, and the plurality of the second detector elements are configured to generate signals in response to photons having a second energy level (Col. 27, Lines 23 – 45).

With regards to claim 17, Mazess discloses the plurality of detector elements are arranged in a plurality of lines, and the detector further comprising an access circuit coupled 18 to the photo detector array and configured to collect signals from two or more of the lines of the detector elements simultaneously (Col. 2, Line 47 – 57) (Claim 5).

Claims 29, 31, 32, 34, 35, 37 and 38 are rejected under 35 U.S.C. 102(b) as being anticipated by Bogatu et al. (US Publication 2002/0191751 A1).

With regards to claim 29, Bogatu discloses a radiation projection detector for generating signals in response to a radiation beam (Figures 8a –8c), comprising: a first filter having a first radiation filtering characteristic; a second filter having a second

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radiation filtering characteristic; a photoconductor layer aligned with the first and the second filters; a detector array aligned with the photoconductor layer.

Regarding claims 31, 32 and 37, Bogatu discloses a filter array arranged in an alternating checkerboard pattern [0045], thus disclosing a plurality of first and second regions.

Regarding claims 34, Bogatu discloses the filters and detectors aligned according to first and second photoconductors and filters (Fig. 8a – 8c).

With regarding to claims 35, Bogatu discloses a conversion layer (Fig. 8a – 8c) comprising amorphous silicon array and first and second filters 32q and 34q comprising first and second characteristics, wherein the first and second filters are coupled to the conversion layer, thus also components of the detector. Additionally, Bogatu discloses a detector array aligned with the conversion layer.

With regards to claims 37 and 38, Bogatu discloses a filter array arranged in an alternating checkerboard pattern [0045], thus disclosing a plurality of first and second regions.

**Claim Rejections - 35 USC § 103**

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mazess in view of Bogatu.

With regards to claim 12, Mazess discloses the claim invention according to claim 11 and a k-edge filter for dual energy purposes, but fails to disclose a filter having a first energy below the k-edge agent and a second filter having a second energy level above the k-edge of a contrast agent (Col 1, Line 4 –55). Bogatu discloses filters with lower and higher energies correlating to lower and above the K-edge agent [0013]. Thus, it would have been obvious to one skill in the art at the time the invention was made to modify Mazess to include a filter having a first energy below the k-edge agent and a second filter having a second energy level above the k-edge of a contrast agent such as that taught by Bogatu to increase image contrast.

Claims 4, 5, 18 – 23, 25 – 28, 41, 45 and 47 - 55 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bogatu in view of Barnes (US Patent 5,138,167).

With regards to claims 18, 19, 41 and 47 - 55, Bogatu discloses a radiation projection detector for generating signals in response to a radiation beam (Figure 8a – 8c), comprising: a photoconductor layer configured to generate charges in response to radiation; and a detector array aligned with the photoconductor layer [0046], the detector array comprises a plurality of detector elements, each of which configured to generate a signal in response to a charge received from the photoconductor layer. Note, Bogatu teaches a side-by-side detector, thus disclosing a first and second detectors formed in a planer surface. Bogatu does not expressly disclose the photoconductor layer further comprising first photoconductor elements having a first charge-generating

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characteristic, second photoconductor elements having second charge-generating characteristic. Barnes teaches dual energy solid-state detectors comprising different semiconductor materials (i.e. the combination of Lead oxide and mercuric oxide) (Col. 11, Line 50 – 55). Thus, it would have been obvious to one skill in the art at the time the invention was made to modify Bogatu to include different semiconductors such as that taught by Barnes in order to improved the detections accuracy and sensitivity.

With regard to claims 4 and 5, Barnes discloses  $HgI_2$  and  $PbI_2$  (Col. 11, Line 48 – 56).

With regards to claim 20, Barnes discloses different thicknesses for the first and second photoconductors (Col. 11, Line 27 – 43).

With regards to claims 21 and 22, Bogatu discloses a filter pair having two different filters used to successively filter each beam according to the  $K_{EDGE}$ . Specifically, a first filter that is greater and a second filter that is slightly less then the  $K_{EDGE, CONTRAST AGENT}$ , thus providing first radiation characteristic above  $K_{EDGE, CONTRAST AGENT}$  and second radiation characteristic below  $K_{EDGE, CONTRAST AGENT}$  [0044].

With regards to claims 23, 25 and 42, Bogatu discloses that the detector comprises first and second imaging elements arranged relative to each other in a checkerboard pattern [0046], thus disclosing a plurality of detectors elements comprising first and second detector elements.

With regards to claim 26 and 27, Bogatu discloses that each detector is electrically wired to a computer to allow the signals generated by the detectors to be processed [0046].



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With regards to claim 28, Barnes discloses the photoconductors elements are made from  $HgI_2$  and  $PbI_2$  (See rejection above).

With regards to claim 45, Bogatu modified does not expressly disclose generating electron-hole-pairs, however electron hole pairs are inherent to said semiconductors.

Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bogatu and Barnes in view of Yamazaki et al. (US Patent 5,570,403).

With regards to claim 24, Bogatu discloses the claimed invention according to claim 18. Bogatu modified does not disclose the first and second imaging elements arranged in a plurality of lines positioned adjacent to one another. Yamazaki teaches an X-ray detection apparatus with varied energy level capability comprising alternating detector rows (Figure 8). It would have been obvious at the time the invention was made to one skilled in the art to further modify Bogatu with alternating detector rows as taught by Yamazaki in order to acquire two sets worth of data.

Claims 33 and 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bogatu in view of Yamazaki.

With regards to claims 33 and 39, Bogatu discloses the claimed invention according to claims 31 and 37. Bogatu does not disclose the first and second imaging elements arranged in a plurality of lines positioned adjacent to one another. Yamazaki teaches an X-ray detection apparatus with varied energy level capability comprising alternating detector rows (Figure 8). It would have been obvious at the time the

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invention was made to one skilled in the art to modify Bogatu with alternating detector rows as taught by Yamazaki in order to acquire two sets worth of data.

Claims 30 and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bogatu in view of Albagli (US Patent 6,418,193 B1).

With regards to claims 30 and 36, Bogatu discloses the invention according to claims 29 and 35. Bogatu does not expressly disclose the first and second filters prepared from a material selected from a group consisting of aluminum, copper, and molybdenum. It would have been obvious to one having ordinary skill in the art at the time the invention was made to include a filter comprising aluminum, copper, and molybdenum, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. *In re Leshin*, 125 USPQ 416. One would also have been motivated to include in Bogatu, a filter comprising aluminum, copper, and molybdenum such as that taught by Albagli (Col. 1, Line 12) in order to use the preferred materials for spectral filters (Col. 1, Line 12).

Claim 43 and 44 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bogatu and Barnes in view of Mazess.

With regards to claim 43 and 44, Bogatu modified discloses the claim invention according to claim 41, but fails to expressly disclose the imaging elements adjacent to each other in a plurality of lines. Mazess teaches an imaging detector comprising imaging elements adjacent to each other in a plurality of lines (See rejection above). Thus, it would have been obvious to one having ordinary skill in the art at the time the

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invention was made to modify Barnes to include imaging elements adjacent to each other in a plurality of lines such as that taught by Mazess in order to improve the sensitivity of the image.

**Response to Arguments**

Applicant's arguments filed 05/29/2007 have been fully considered but they are not persuasive.

With regards to claims 1 and 9, applicant suggests that Mazess fails to disclose a first and second scintillating material wherein the said scintillating materials are not the same. The examiner respectfully disagrees.

Mazess discloses a side-by-side detector comprising high and low energy detectors. The low-energy detector includes a photodiode coupled with a scintillator material and the high-energy detector also includes a photodiode coupled with a scintillator material providing good sensitivity to high energy x-rays. Notice the emphasis on the high-energy detector comprising a scintillating material that will differentiate itself from the low-energy detector. Hence, implicitly disclosing different materials that exhibit different sensitivities to different energies. Mazess further states, "The scintillation materials [note the plurality] 308 and 312 are selected according to the desired energy sensitivity of the detector element according to methods known in the art". Thus, also implicitly disclosing different materials as appreciated and/or known in the art.

Additionally, Frank et al. (6,445,765 B1) teaches the appreciated methods known in the art as discussed by Mazess. Frank teaches high and low energies detectors comprise different chemical composition and densities (col. 1, Line 24). Furthermore, Frank

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teaches different materials with specific atomic numbers for high and low energy detectors (Col. 1, Line 45). Therefore, Mazesss' disclosure meets the claimed limitation as recited in applicants' claims 1 and 9.

With regards to claims 29 and 35, applicant suggests that Bogatu fails to disclose filters coupled to photoconductors. The examiner respectfully disagrees.

Bogatu discloses filters coupled (i.e., optically coupled at the least) to photoconductors. If Bogatu does not disclosed filters coupled to said photoconductors, how would said filters and said\*photoconductors communicated with each other in the first place? Thus, Bogatu disclosure meets the claimed limitation as recited in applicants' claims 29 and 35.

With regards to claims and 18 and 41, applicant amended the claims to include first and second detectors forming "a surface" and claims Barnes fails to disclose the recited limitation. The examiner agrees that Barnes fails to disclose one surface comprising first and second photodetectors. Barnes teaches a stacked configuration and thus fails to teach a side-by-side detector configuration (i.e., one surface). However, the examiner used Barnes disclosure to modify Bogatus' detectors to include multiple photoconductors (i.e., high and low energy detectors), not modifying Bogatus side-by-side detector for Barnes stacked configuration. Therefore, when Bogatus' side-by-side detector (i.e., planer detector) is modified to include the multiple photoconductors, such as that taught by Barnes, the side-by-side detector of Bogatus' nonetheless exhibits a planer surface. As a result including first and second detectors forming "a surface" as

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recited in claims 18 and 41. Thus, Bogatus' disclosure as modified in view of Barnes' disclosure meets the claimed limitation as recited in applicants' claims 18 and 41.

**Conclusion**

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Djura Malevic whose telephone number is 571.272.5975. The examiner can normally be reached on Monday - Friday between 8:30am and 4:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Porta can be reached on (571) 272-2444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

**Djura Malevic**  
**Patent Examiner**  
**Art Unit 2884**  
**571.272.5975**



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